ABSTRACT

An indirectly heated cathode ion source includes an extraction current sensor for sensing ion current extracted from the arc chamber and an ion source controller for controlling the filament power supply, the bias power supply and/or the arc power supply. The ion source controller may compare the sensed extraction current with a reference extraction current and determine an error value based on the difference between the sensed extraction current and the reference extraction current. The power supplies of the indirectly heated cathode ion source are controlled to minimize the error value, thus maintaining a substantially constant extraction current. The ion source controller utilizes a control algorithm, for example a closed feedback loop, to control the power supplies in response to the error value. In a first control algorithm, the bias current I_B supplied by the bias power supply is varied so as to control the extraction current I_E. Further according to the first control algorithm, the filament current I_F and the arc voltage V_A are maintained constant. According to a second control algorithm, the filament current I_F is varied so as to control the extraction current I_E. Further according to the second control algorithm, the bias current I_B and the arc voltage V_A are maintained constant.